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Abstract : This technical report covers the work carried out under a Memorandum of Understanding between NAL and DRDL to develop a missile prediction code for estimation of aerodynamic characteristics at high angles of attack, high Mach number range, arbitrary control deflections and non-zero roll orientations. The computer code has been developed based on the Equivalent angle of attack technique. This technique combines semi-empirical methods, theoretical methods and correlated data bases. The code can predict the normal force, side force, pitching moment, yawing moment and rolling moment coefficients of missile configuration upto high angles of attack (upto 30°), Mach numbers from 0.8 to 5.0, arbitrary control deflections (±25°) and non-zero roll angles ($0 \leq \phi \leq 90°$). It also accounts for various nose geometries and vortices interaction on fins. The fins are limited to low aspect ratio (≤ 4.0, typical of fins used in conventional missiles) with zero or small trailing edge sweep angles. The computer code has been validated over a wide range of missile configurations and flow parameters. The overall capabilities of the code have also been compared with nine other missile aeroprediction codes. These studies indicate the capability and dependability of the code in the preliminary design of missile configurations.